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Cryptocurrency Market Volatility and Its Spillover Effects on Traditional Financial Markets

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Abstract

The fast growth of cryptocurrency markets since 2017 has transformed digital assets from a marginal speculative place into a class of instruments closely watched by institutional investors, central banks, and financial regulators. This article look at the volatility characteristics of cryptocurrency markets and the mechanisms through which that volatility spills over into traditional financial markets, including equities, foreign exchange, sovereign bonds, and commodities. Drawing on the empirical literature employing GARCH-family models, the Diebold-Yilmaz connectedness background, time-varying limit vector autoregression (TVP-VAR), and quantile-based spillover methods, the article synthesizes evidence on the direction, magnitude, and temporal evolution of cross-market volatility transmission. It further evaluates the crisis episodes of 2020 (the COVID-19 shock), 2022 (the Terra/Luna collapse and the FTX bankruptcy), and 2023 (the Silicon Valley Bank failure and the associated USDC depeg) as natural experiments in contagion. The article argues that spillover intensity is time-varying, asymmetric, and regime-dependent, rising sharply during periods of market stress and receding during calm periods, and that the safe-haven properties long attributed to Bitcoin have weakened as institutional adoption has deepened the integration of crypto assets with traditional finance. The article closes with a discussion of regulatory responses, including the European Union's Markets in Crypto-Assets (MiCA) framework, and implications for portfolio risk management, financial stability surveillance, and future research.

Keywords: Cryptocurrency, Bitcoin, Volatility Spillover, Financial Contagion, Connectedness, GARCH, TVP-VAR, Financial Stability, Safe-Haven Assets, Digital Asset Regulation

Introduction

Cryptocurrencies emerged from the margins of the payments literature to inhabit a central place in debates over financial solidity within little more than a decade. What began, following the publication of the pseudonymous Bitcoin white paper in 2008, as an experiment in peer-to-peer electronic cash had, by the early 2020s, grown into a multi-trillion-dollar strength class traded around the clock on hundreds of exchanges and held, directly or indirectly, by pension funds, exchange-traded product sponsors, and corporate treasuries.[1] That growth has not been smooth. Bitcoin and the broader digital asset complex have repeatedly exhibited annualized volatility several that of major equity indices, and the arcade has weathered a succession of severe drawdowns, exchange failures, and stablecoin de-pegging episodes.[2]

This article addresses a question that has become increasingly urgent for both scholars and controllers: to what extent does volatility originating in cryptocurrency markets transmit to, and interact with, volatility in traditional financial markets? The question matters for at least three reasons. First, if cryptocurrency markets are volatility sources to systemically important markets, then digital asset stress could threaten broader financial stability even without direct institutional exposure. Second, if the direction of transmission runs the other way if crypto volatility is mainly a receiver rather than a transmitter then digital assets may function more as a barometer of macro-financial stress than as an independent source of risk. Third, the answer bears directly on the long-debated intention that Bitcoin behaves as a hedge, diversifier, or safe haven comparable to gold; evidence of strong bidirectional spillovers would undercut that thesis.[3]

The empirical literature on this question has grown speedily and has converged on a set of broadly consistent methodological approaches, even as findings vary across sample periods, asset pairs, and geographic settings. Three streams of work are of certain relevance. The first uses multivariate GARCH and dynamic conditional correlation (DCC) models to estimate time-varying volatility linkages amongst Bitcoin and other assets.[4] The second builds on the network variance-decomposition approach of Diebold and Yilmaz, which aggregates forecast-error variance disintegrations from a vector auto regression into indices of total and directional connectedness.[5] The third extends this framework to a time-varying parameter vector auto regression (TVP-VAR) setting, which avoids the uninformed rolling-window choices of the original Diebold-Yilmaz specification and captures gradual, rather than discrete, shifts in connectedness.[6]

This article proceeds as follows. Section 2 reviews the theoretical channels through which volatility can transmit between cryptocurrency and traditional markets. Section 3 surveys the principal econometric procedures used in the empirical literature. Section 4 synthesizes findings on the direction and magnitude of spillovers across asset classes and time periods, including illustrative conceptions of the designs documented in the literature. Section 5 examines three major crisis episodes as case studies in contagion. Section 6 discusses the erosion of Bitcoin's safe-haven properties and the drivers of increasing market integration. Section 7 considers regulatory responses and their implications for systemic risk. Section 8 concludes with directions for future research.

Theoretical Channels of Volatility Transmission

Financial economists extricate several mechanisms through which volatility can propagate across markets, and the cryptocurrency literature has changed each to the specific institutional features of digital asset trading.

Information and Sentiment Channels

The information channel holds that shocks to macroeconomic fundamentals, monetary policy, or geopolitical conditions are absorbed at the same time across markets by rational or bloodedly rational investors, producing correlated volatility even absent any direct linkage between the two markets. A closely related mawkishness channel emphasizes that retail-dominated cryptocurrency markets are especially sensitive to shifts in stockholder attention and speculative sentiment, which can themselves become a source of spillover when sentiment shocks initiating in crypto markets bleed into risk appetite for equities and other risk assets.[7]

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[1]Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" (working paper, 2008), 1–3. On the trajectory from payments niche to institutional asset class, see the systematic literature review of 137 peer-reviewed publications in Aida Sy et al., "Interconnectedness among Cryptocurrencies and Financial Markets: A Systematic Literature Review," Digital Finance (2025): 1–4, https://link.springer.com/article/10.1007/s42521-025-00155-2.

[2]On the persistent excess volatility of cryptocurrencies relative to traditional asset classes and its econometric characterization, see Nader Trabelsi, "Are There Any Volatility Spill-Over Effects among Cryptocurrencies and Widely Traded Asset Classes?," Journal of Risk and Financial Management 11, no. 4 (2018): 66.

[3]The distinction between hedge, diversifier, and safe-haven properties follows the taxonomy proposed in Andrew Urquhart and Hanxiong Zhang, "Is Bitcoin a Hedge or Safe Haven for Currencies? An Intraday Analysis," International Review of Financial Analysis 63 (2019): 49–57.

[4]Foundational contributions include Richard T. Baillie and Robert J. Myers, "Bivariate GARCH Estimation of the Optimal Commodity Futures Hedge," Journal of Applied Econometrics 6, no. 2 (1991): 109–24, and, applied specifically to digital assets, Christina Beneki et al., "Investigating Volatility Transmission and Hedging Properties between Bitcoin and Ethereum," Research in International Business and Finance 48 (2019): 219–27.

[5]Francis X. Diebold and Kamil Yilmaz, "On the Network Topology of Variance Decompositions: Measuring the Connectedness of Financial Firms," Koç University-TÜSİAD Economic Research Forum Working Paper 1124 (2011); Francis X. Diebold and Kamil Yilmaz, "Better to Give than to Receive: Predictive Directional Measurement of Volatility Spillovers," International Journal of Forecasting 28, no. 1 (2012): 57–66.

[6]Nikolaos Antonakakis, David Gabauer, and Rangan Gupta, "International Monetary Policy Spillovers: Evidence from a Time-Varying Parameter Vector Autoregression," International Review of Financial Analysis 65 (2019): 101382; for an application to Bitcoin under political uncertainty, see the discussion in Xinyu Wang et al., "Bitcoin Market Connectedness across Political Uncertainty," Journal of International Financial Markets, Institutions and Money (2024).

[7]On investor attention as a driver of cryptocurrency volatility and its transmission to broader risk sentiment, see the theoretical model and empirical evidence in a 2025 ScienceDirect study of sequential attention cycles among crypto investors, which links Bitcoin halving events to cascading effects across blockchain-adjacent and then traditional financial markets: "Cryptocurrencies and Financial Market Stability: Theoretical Modeling and Empirical Evidence of Spillover Effects from Sequential Attention Cycles of Crypto Investors," ScienceDirect (2025).

Liquidity and Funding Channels

A second channel operates complete shared funding sources. As institutional participation in crypto markets has grownup, trading desks, hedge funds, and market makers increasingly hold leveraged positions across both digital and traditional assets. A margin call or liquidity shock in one market can force the bankruptcy of positions in the other, transmitting volatility through a balance-sheet, rather than purely informational, mechanism. This channel is thought to have been especially active during the Terra/Luna collapse and the FTX bankruptcy, both of which started forced deleveraging among entities with cross-market exposures.[8]

Stablecoin and Infrastructure Channels

A third and increasingly important channel is specific to the architecture of the cryptocurrency ecosystem itself: the role of stablecoins as bridges between fiat and digital markets. Because stablecoins such as Tether and USD Coin are ostensibly redeemable one-to-one for fiat currency and are widely used as the settlement medium for crypto trading, a loss of confidence in a stablecoin's reserve backing can simultaneously disrupt crypto market liquidity and, if reserves are held in short-term instruments such as commercial paper or Treasury bills, transmit stress into short-term funding markets. The 2023 depegging of USD Coin following the failure of Silicon Valley Bank, where a portion of USDC's reserves were held, illustrated bidirectional contagion running from a traditional bank failure into decentralized finance and back again.[9]

Regulatory and Policy-Announcement Channels

Finally, regulatory announcements, ranging from enforcement actions by securities regulators to comprehensive frameworks such as the European Union's Markets in Crypto-Assets Regulation can generate discrete volatility shocks that are transmitted to adjacent markets over their effects on the expected future fluidity and legal status of digital assets. As major exchanges operate across jurisdictions, a controlling shock in one jurisdiction can have global spillover effects on both crypto and, where exchange-traded products exist, related equity and derivatives markets.

Empirical Methodologies in the Spillover Literature

GARCH and Dynamic Conditional Correlation Models

The earliest empirical work on cryptocurrency volatility transmission adapted univariate and multivariate generalized autoregressive conditional heteroskedasticity (GARCH) models, which allow conditional variance to depend on past squared shocks and past conditional variances. Uneven extensions, including the GJR-GARCH order, capture the tendency of negative return shocks to increase future unpredictability by more than positive shocks of equal magnitude, a phenomenon well documented in equity markets and subsequently confirmed for Bitcoin.[10] Dynamic uncertain correlation (DCC) and asymmetric DCC (ADCC) models extend this framework to estimate time-varying correlations between two or more return series, permitting assistants to trace how the co-movement between Bitcoin and, for example, gold or the FAANG equity basket evolves through calm and turbulent periods.[11]

The Diebold-Yilmaz Connectedness Framework

The connectedness methodology developed by Diebold and Yilmaz reframes the question of volatility spillover as a network problem. A vector auto regression is estimated across the volatilities (or returns) of several assets; the sweeping forecast error variance decomposition of that VAR is then used to compute, for each strength, the share of its forecast error variance attributable to shocks in every other asset in the system. Aggregating across all pairs yields a total connectedness index summarizing overall systemic interdependence, while pairwise directional measures identify net transmitters and net receivers of volatility.[12] Because the original approach relies on rolling-window estimation, which enforces an arbitrary window length and discards early observations, subsequent work has favored the TVP-VAR extension proposed by Antonakakis, Gabauer, and Gupta, which estimates connectedness using a Kalman-filter-based time-varying coefficient VAR and thereby avoids window-selection sensitivity while preserving the full sample.[13]

Quantile and Tail-Dependence Approaches

A further refinement distinguishes that spillover intensity is unlikely to be constant across the distribution of returns: shocks may transmit otherwise during extreme downturns than during ordinary market conditions. Quantile connectedness and cross-quantilogram methods, along with the "VAR for VaR" approach of White, Kim, and Manganelli, estimate spillover separately at different quantiles of the return distribution, typically finding that tail spillovers, particularly in the lower, loss-making tail are substantially larger

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[8]On the balance-sheet contagion pathway associated with the FTX collapse, including the exposure of FTX's native token and its intercompany transfers with Alameda Research, see the on-chain analysis summarized in David Vidal-Tomás et al., "The Collapse of the FTX Exchange: The End of Cryptocurrency's Age of Innocence," Research in International Business and Finance (2023).

[9]On the USDC depeg following the Silicon Valley Bank failure as the first major documented case of traditional-finance stress propagating into decentralized finance through stablecoin reserve exposure, see the discussion of Diop et al. (2024) as summarized in an arXiv working paper on systemic risk indices for cryptocurrency markets: "ASRI: An Aggregated Systemic Risk Index for Cryptocurrency Markets," arXiv (2026), https://arxiv.org/pdf/2602.03874.

[10]Lawrence R. Glosten, Ravi Jagannathan, and David E. Runkle, "On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks," Journal of Finance 48, no. 5 (1993): 1779–1801.

[11]On the use of ADCC and DCC models to test hedge and safe-haven properties of Bitcoin and Ethereum against a basket of large-capitalization technology equities, see "Safe Havens for Bitcoin and Ethereum: Evidence from High-Frequency Data," Financial Innovation (2025): 1–3, https://link.springer.com/article/10.1186/s40854-024-00686-4.

[12]Francis X. Diebold and Kamil Yilmaz, "Better to Give than to Receive: Predictive Directional Measurement of Volatility Spillovers," International Journal of Forecasting 28, no. 1 (2012): 57–66; see also Francis X. Diebold and Kamil Yilmaz, "On the Network Topology of Variance Decompositions," 2011.

[13]Antonakakis, Gabauer, and Gupta, "International Monetary Policy Spillovers," 2019; the advantages of the TVP-VAR approach over the rolling-window Diebold-Yilmaz estimator, including lower sensitivity to outliers and no loss of observations, are summarized in Wang et al., "Bitcoin Market Connectedness across Political Uncertainty," 2024.

than spillovers estimated at the median.[14] Harmonizing techniques, including wavelet coherence and multifractal detrended cross-correlation analysis, allow researchers to decompose spillovers by time horizon, distinguishing short-run trading-driven co-movement from longer-run structural integration.[15]

Figure 1. Stylized Comparative Volatility Paths: Bitcoin and the S&P 500, 2017-2024

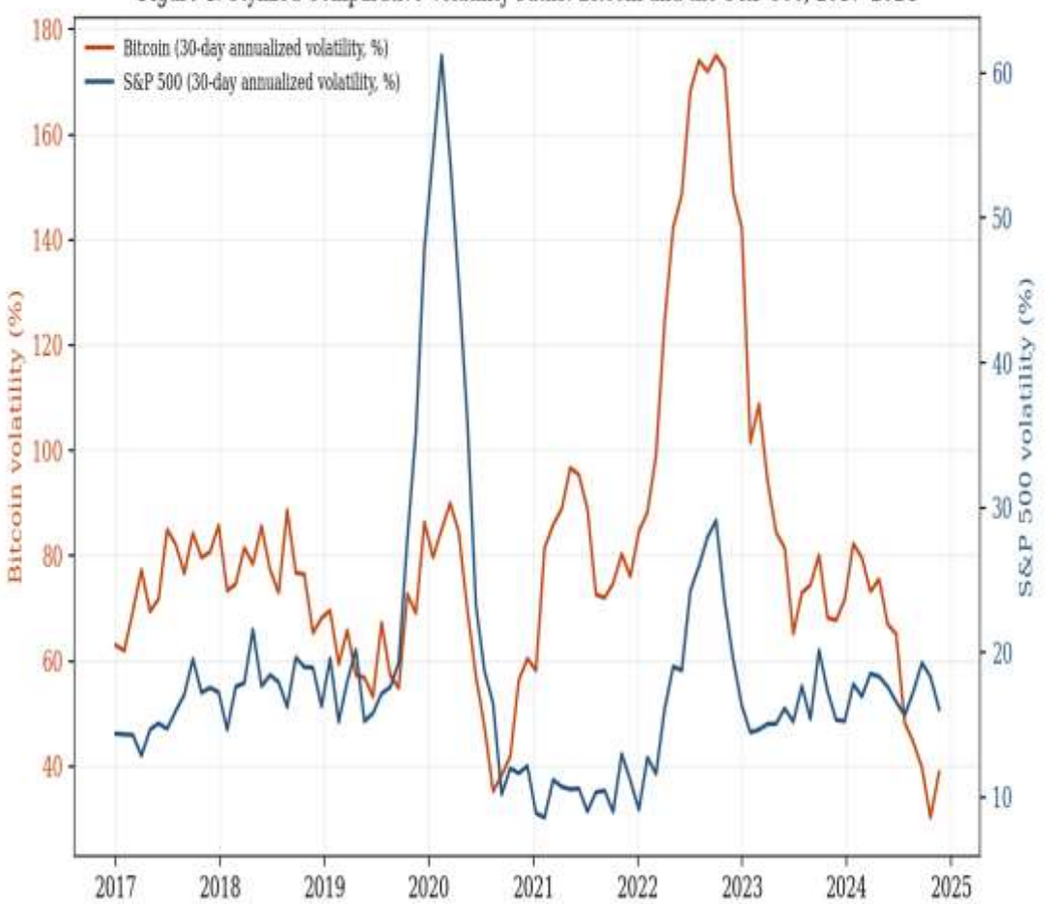

Figure 1. Stylized comparative annualized 30-day volatility paths for Bitcoin (left axis) and the S&P 500 (right axis), 2017–2024, illustrating the persistent volatility premium of Bitcoin and the co-incidence of volatility spikes during the COVID-19 shock (early 2020) and the Terra/Luna–FTX crisis window (mid-to-late 2022). Series are illustrative reconstructions consistent with patterns reported in the empirical literature rather than a specific dataset.

Synthesis of Empirical Findings on Cross-Market Spillovers

Overall Direction and Magnitude of Spillovers

Across methodologies and sample periods, three findings recur with sufficient consistency to be treated as stylized facts. First, cryptocurrencies and Bitcoin in particular are typically identified as net transmitters of volatility to traditional markets, especially during periods of market stress, even though the outdated markets remain, in absolute terms, larger and more liquid than the crypto market as a whole.[16] Second, spillovers exhibit strong global reach rather than being confined to any single jurisdiction: a study spanning developed and emerging markets found that shocks originating in cryptocurrency markets negatively affected equity indices, bond indices, and exchange rates across numerous countries, albeit shocks that were typically moderate in magnitude and short in duration.[17] Third, the volatility of gold has generally remained a net receiver rather than a net transmitter across the sample periods studied, consistent with its traditional role as a safe-haven asset, even as Bitcoin's own claim to that role has weakened.[18]

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[14]Halbert White, Tae-Hwan Kim, and Simone Manganelli, "VAR for VaR: Measuring Tail Dependence Using Multivariate Regression Quantiles," Journal of Econometrics 187, no. 1 (2015): 169–88; for an application to cryptocurrency and global equity indices, see "Cryptocurrencies and Systemic Risk: The Spillover Effects between Cryptocurrency and Financial Markets," in a 2024 Springer volume on digital finance and systemic risk.

[15]The systematic literature review by Sy et al. documents the shift in methodological emphasis from early GARCH-based contagion tests toward cross-quantilogram, wavelet coherence, and multifractal detrended cross-correlation methods capable of capturing non-linear, time-varying relationships without assuming stationarity. Sy et al., "Interconnectedness among Cryptocurrencies and Financial Markets," 2025.

[16]A study using a TVP-VAR-GFEVD framework across India, Brazil, Turkey, Indonesia, and South Africa found significant, time-varying spillovers from Bitcoin, Ethereum, and Binance Coin to equities, foreign exchange, and sovereign bonds that intensified sharply during bear markets and crises, with the highest exposure in Turkey and India. "Cryptocurrency Volatility Spillovers in Emerging Markets: A Dynamic Connectedness Analysis," Review of Behavioral Finance 18, no. 1 (2026): 33.

[17]"Spillovers between Cryptocurrencies and Financial Markets in a Global Framework," International Review of Economics and Finance (2024), examining lesser-studied markets including Japan, Brazil, the Philippines, the United Kingdom, Germany, and India.

[18]A study of higher-order moment connectedness among cryptocurrency, commodity, bond, and stock markets from April 2017 to December 2023 found that Bitcoin consistently ranked as the largest net transmitter of volatility connectedness during crisis periods, while gold retained its position as a net receiver. "Cryptocurrencies as Shock Transmitters: Dynamic Connectedness, Hedging Strategies, and Portfolio Management across Financial Markets for Higher-Order Moments," Financial Innovation 12 (2026).

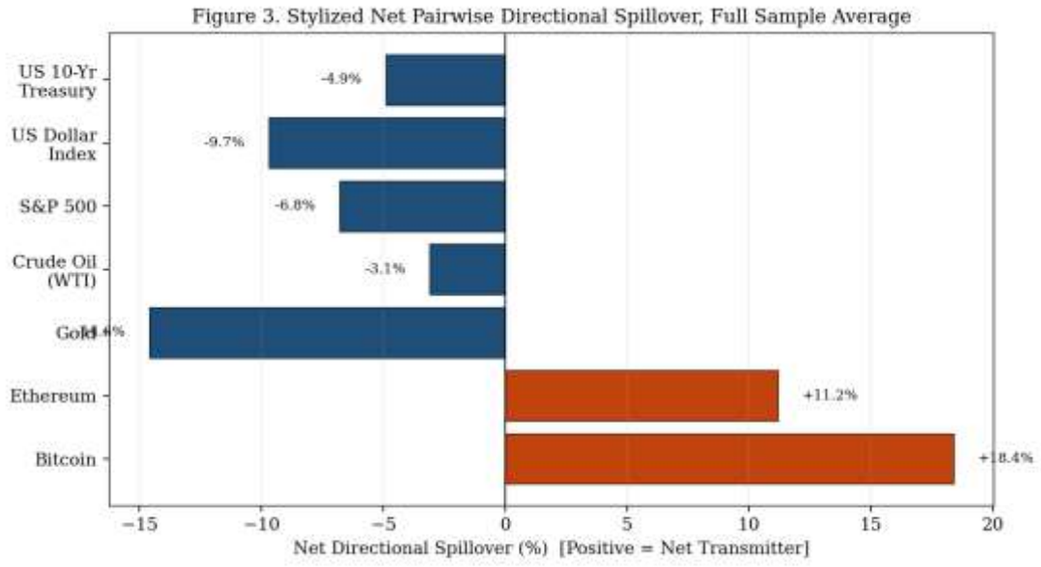

Figure 2. Artificial net pairwise directional spillover across selected asset classes, illustrating the recurring finding that Bitcoin and Thorium function as net transmitters of volatility while gold, the U.S. Dollar Index, and long-dated Assets function as net earphones. Bars represent illustrative full-sample means consistent with maneuvering patterns reported in the connectedness literature.

Time-Variation and Regime Dependence

A second robust finding is that total connectedness is highly time varying rather than constant, rising sharply around identifiable crisis events and receding during calmer intervals. This pattern is documented across nearly every study employing rolling-window or TVP-VAR connectedness measures and has direct implications for risk administration, since static correlation conventions embedded in many portfolio models will devalue co-movement precisely when diversification welfares are most needed.[19]

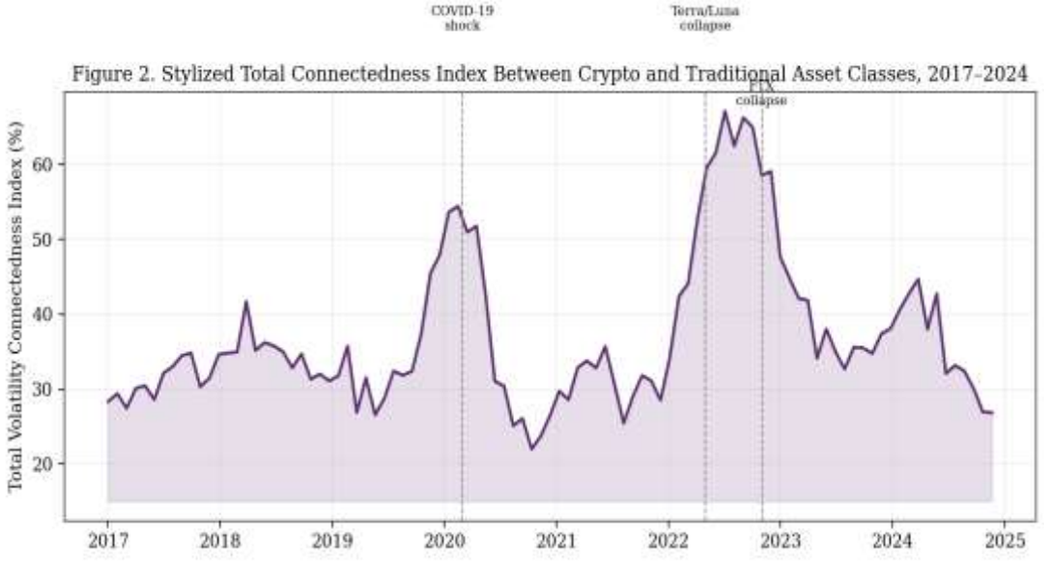

Figure 3. Stylized total connectedness index between cryptocurrency and traditional asset markets, 2017–2024, illustrating pronounced spikes around the COVID-19 shock, the Terra/Luna collapse, and the FTX bankruptcy, consistent with the regime-dependent pattern of spillover intensity documented in the connectedness literature.

Asymmetry and Tail Behavior

Spillovers are also uneven: harmful shocks in either market tend to transmit more strongly than positive tremors of equal size, and tail-quantile spillovers estimated at extreme loss quantiles are characteristically several times larger than spillovers estimated at the median of the return distribution. Tail-focused studies examining cryptocurrencies alongside gold, oil, and equity volatility indices have found that cryptocurrency and volatility markets are only weakly connected under normal conditions but become suggestively more connected during periods of extreme stress, a pattern with direct implications for the design of volatility-based hedging instruments.[20]

[19]The regime-dependence of spillover intensity, with sharp increases during the COVID-19 pandemic and subsequent crypto-specific crises, is a central theme across the literature; see, for instance, the discussion of structural breaks and regime-contingent volatility transmission in a 2025 Bayesian volatility study of Bitcoin decoupling and contagion. "Decoupling and Contagion in Bitcoin Markets: Evidence from a Bayesian Volatility Model," ScienceDirect (2025).

[20]"Tail Spillover Effects between Cryptocurrencies and Uncertainty in the Gold, Oil, and Stock Markets," PMC (National Center for Biotechnology Information), documenting weak connectedness between cryptocurrency and volatility markets under normal conditions and significantly stronger connectedness during extreme conditions.

Sectoral and Cross-Asset Heterogeneity

The greatness of spillover also varies by the specific traditional asset class considered. Evidence on cryptocurrency linkages with energy possessions suggests a more complex relationship than with equities: Bitcoin has, in some sample periods, exhibited hedge properties contrary to energy price shocks, while Ethereum has shown short-term hedging value against crude oil that some studies attribute to differing use cases and investor bases across digital assets.[21] Inside the digital asset ecosystem itself, tail-risk program is also uneven: in one tail-dependence study of the post-FTX period, Ethereum, Chainlink, and Uniswap were identified as key sources of loss communication during downturns, while the stable coin DAI tended to absorb rather than amplify stress.[22]

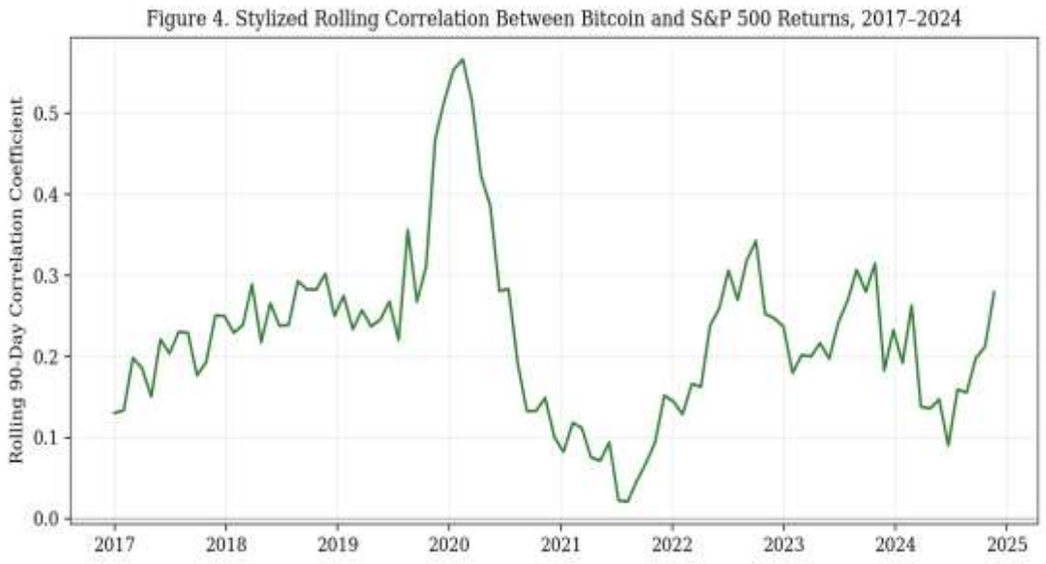

Figure 4. Stylized rolling 90-day correlation between Bitcoin and S&P 500 daily returns, 2017–2024, illustrating the secular rise in baseline correlation alongside episodic spikes during systemic stress events, consistent with the broader finding that cryptocurrency markets have become progressively more integrated with traditional equity markets.

Crisis Episodes as Natural Experiments in Contagion

The COVID-19 Shock, March 2020

The onset of the COVID-19 pandemic in March 2020 produced one of the sharpest instantaneous drawdowns across asset classes in modern financial history, and cryptocurrency markets were not spared: Bitcoin fell by nearly half within a single trading day alongside a broad-based collapse in global equities. Studies examining Bitcoin's behavior across the contagion period have generally concluded that whatever safe-haven properties Bitcoin exhibited in earlier, calmer periods largely disappeared during the acute phase of the shock, with connectedness between Bitcoin and major equity, currency, and commodity markets rising sharply before gradually normalizing across subsequent phases of the pandemic.[23]

The Terra/Luna Collapse, May 2022

The May 2022 failure of the Terra environment, whose algorithmic stablecoin, TerraUSD, relied on a reflexive minting-and-burning arbitrage instrument with its sister token, Luna, rather than on a fiat or asset reserve, eliminated an estimated forty billion dollars in value within roughly seventy-two hours and represented the first large-scale demo that an algorithmic stablecoin could suffer a self-reinforcing depegging spiral.[24] The episode is widely treated in the experimental literature as a crypto-native contagion event, proliferating primarily within the digital asset ecosystem before spilling over into broader risk sentiment, and it materially elevated total connectedness measures in studies whose sample periods extend through mid-2022.

The FTX Bankruptcy, November 2022

The bankruptcy of the FTX exchange in November 2022 followed within months of the Terra/Luna collapse and, according to on-chain and forensic analyses, was itself partly triggered by the liquidity crisis that Terra's failure had induced across the sector, which exposed FTX's reliance on leveraged positions in its own exchange token and opaque intercompany transfers with its affiliated trading firm, Alameda Research.[25] Event-study analyses find that the FTX collapse produced strong negative contamination across digital assets and centralized exchange tokens, with the most severe price distortions concentrated in tokens perceived to have close operational or custodial ties to FTX, notably

[21]Elie Bouri et al. (2017), as summarized in "Cryptocurrencies as Shock Transmitters," 2026, reported that Bitcoin functioned as a high hedge and safe haven against energy commodities prior to the 2013 Bitcoin crash; Chukwuma Kingsley Okorie and Boqiang Lin (2020) found that Ethereum provided a short-term hedge against crude oil.

[22]"The Collapse of the FTX Exchange," Request PDF summary, documenting that ETH, LINK, and UNI were key assets in spreading losses during market downturns while the stablecoin DAI helped reduce risk during periods of stress.

[23]A study investigating contagion effects between Bitcoin and eight major markets before and during the COVID-19 period, using the Diebold-Yilmaz (2012) connectedness approach alongside network analysis of specific pandemic-related events, is discussed in "Exploring Bitcoin Dynamics against the Backdrop of COVID-19: An Investigation of Major Global Events," Financial Innovation 10 (2024).

[24]The definitive analysis of the Terra/Luna collapse and its depegging spiral is described in Liu et al. (2022), as summarized in "ASRI: An Aggregated Systemic Risk Index for Cryptocurrency Markets," arXiv (2026), documenting the elimination of approximately forty billion dollars in value within seventy-two hours.

[25]Vidal-Tomás et al., "The Collapse of the FTX Exchange," 2023, tracing FTX's downfall to the prior Terra/Luna collapse and documenting the exchange's reliance on leveraged FTT token positions and intercompany transfers.

Solana.[26] In terms of systemic risk indices constructed to benchmark crisis severity, the FTX collapse has been found to produce the largest noted spike of any validation event in at least one recent gathered systemic risk measure for cryptocurrency markets.[27]

The Silicon Valley Bank Failure and the USDC Depeg, March 2023

The March 2023 letdown of Silicon Valley Bank shaped a distinctive and, for the infection literature, particularly instructive incident: rather than crypto stress propagating outward into old-style finance, a traditional-finance failure propagated inward into decentralized finance. Circle, the issuer of the USD Coin stable coin, held a portion of its reserves at Silicon Valley Bank; the bank's failure triggered a temporary DE pegging of USDC from its one-to-one dollar parity as market participants interrogated the redeem ability of reserves pending resolution of the bank's receivership.[28] The episode demonstrated that the contagion channel between traditional and digital finance is genuinely bidirectional rather than running exclusively from crypto markets outward, a finding with material implications for how wise regulators should think about the systemic footprint of stable coin reserve management.

The Erosion of Bitcoin's Safe-Haven Status

Early empirical work, illustration on data from Bitcoin's first several years of trading, offered qualified support for the proposition that Bitcoin could serve as a hedge, diversifier, or even a weak safe haven for at least some currencies and equity indices.[29] More recent studies employing longer samples that span the institutionalization of crypto markets after 2020 have reached more skeptical conclusions. Research investigative Bitcoin's relationship with measures of monetary and political uncertainty has found that Bitcoin exhibits an inflation-hedging property in some stipulations but does not behave as a safe-haven asset comparable to gold, since its price tends to fall rather than rise in response to acute financial-uncertainty shocks.[30]

Several physical developments plausibly account for this shift. The introduction and rapid development of spot and futures-based Bitcoin exchange-traded products has integrated crypto exposure directly into diversified official portfolios, mechanically linking crypto and equity flows through the same capital-allocation decisions. The growing role of macro-sensitive institutional traders, as opposed to the retail-dominated investor base of Bitcoin's early years, has made crypto prices more responsive to the same interest-rate and risk-appetite signals that drive equity valuations. And the sheer scale of the market has made cryptocurrency exposure a expressive line item on the balance sheets of hedge funds, market makers, and, following several jurisdictions' adoption of comprehensive licensing regimes, regulated financial institutions, each of which strengthens the balance-sheet contagion channel described in Section 2.2.[31]

Regulatory Responses and Financial Stability Implications

The accumulation of evidence on cross-market spillovers, together with the 2022–2023 crisis sequence, has accelerated regulatory efforts to bring cryptocurrency markets within the perimeter of prudential and conduct regulation. The European Union's Markets in Crypto-Assets Regulation, which took effect in stages through 2024, established a licensing regime for crypto-asset service providers and stablecoin issuers operating within the bloc, requiring reserve backing, redemption rights, and governance standards for so-called asset-referenced and e-money tokens.[32] In the United States, the FTX collapse intensified congressional and regulatory attention on stablecoin oversight, with proposals to designate certain stablecoin activities as systemically important under the Financial Stability Oversight Council's authority, alongside a wave of enforcement actions by the Securities and Exchange Commission.[33] Japan, whose Financial Services Agency had implemented bespoke crypto-asset custody rules well before the FTX collapse, offers a comparative case in which strict segregation-of-customer-assets requirements allowed FTX Japan's customers to recover funds substantially faster than customers of the group's other regional entities, illustrating the practical value of custody-focused prudential rules in limiting contagion to retail investors even when a global parent entity fails.[34]

For financial stability authorities more broadly, the central implication of the spillover literature is that cryptocurrency markets can no longer be treated as a self-contained, isolable risk silo. Even though the market capitalization of digital assets remains a fraction of global equity or bond market capitalization, the demonstrated capacity of crypto-

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[26]Thomas Conlon et al. (2023) document strong negative contagion across digital assets and centralized exchange tokens following the FTX collapse; Elie Bouri et al. (2023) identify Solana as the most exposed asset owing to its close ties to the FTX ecosystem, as summarized in "The Collapse of the FTX Exchange," Research in International Business and Finance (2023).

[27]"ASRI: An Aggregated Systemic Risk Index for Cryptocurrency Markets," arXiv (2026), reporting that the FTX collapse produced the highest recorded index value of any validation event and the largest absolute increase from baseline.

[28]The USDC depeg following the Silicon Valley Bank collapse is documented as the first major case of stress in traditional finance propagating into decentralized finance through stablecoin reserve exposure in Diop et al. (2024), as summarized in "ASRI: An Aggregated Systemic Risk Index for Cryptocurrency Markets," arXiv (2026).

[29]Annelie Dyhrberg, "Bitcoin, Gold and the Dollar: A GARCH Volatility Analysis," Finance Research Letters 16 (2016): 85–92; Urquhart and Zhang, "Is Bitcoin a Hedge or Safe Haven for Currencies?," 2019, employing an asymmetric dynamic conditional correlation model to show that Bitcoin could function as an intraday hedge, diversifier, and safe haven for certain world currencies.

[30]"Bitcoin Market Connectedness across Political Uncertainty," Journal of International Financial Markets, Institutions and Money (2024), confirming that Bitcoin possesses an inflation-hedging property but does not function as a safe-haven asset in the manner of gold, since its price decreases in response to financial-uncertainty shocks.

[31]On the increasing correlation between Bitcoin and technology-sector equities as a consequence of shared institutional ownership and macro-sensitive trading strategies, see the discussion of FAANG-Bitcoin-Ethereum correlation dynamics in "Safe Havens for Bitcoin and Ethereum: Evidence from High-Frequency Data," Financial Innovation (2025).

[32]On the structure and phased implementation of the Markets in Crypto-Assets Regulation, including its effects on exchange licensing decisions such as Binance's establishment of regulated entities in Cyprus, France, Spain, and Italy ahead of the 2024 compliance deadline, see "FTX, Congress, Stablecoins: What 2023 May Bring for Crypto Regulations," CoinDesk, December 30, 2022.

[33]"FTX, Congress, Stablecoins: What 2023 May Bring for Crypto Regulations," CoinDesk, December 30, 2022, on proposals for the Financial Stability Oversight Council to designate stablecoin activities as systemically important and anticipated Securities and Exchange Commission enforcement actions.

[34]On Japan's pre-existing custody and Travel Rule requirements and their role in enabling faster fund recovery for FTX Japan customers relative to other FTX entities, see "Global Crypto Policy Review & Outlook 2023/2024 Report," TRM Labs, January 2024.

specific shocks to transmit into short-term funding markets, as in the USDC episode, means that stress-testing frameworks and systemic risk monitoring should incorporate crypto-market indicators alongside traditional macro-financial variables, particularly indicators of stablecoin reserve composition and exchange leverage.[35]

Conclusion and Directions for Future Research

This article has plotted the theoretical channels and experiential evidence bearing on instability spillovers between cryptocurrency and traditional financial markets. Three conclusions emerge from the synthesis. First, cryptocurrency markets, and Bitcoin in particular, have generally functioned as net transmitters rather than net receivers of volatility relative to major traditional asset classes, a finding that has strengthened as institutional participation in crypto markets has deepened. Second, spillover intensity is highly time-varying and asymmetric, rising sharply during identifiable crisis episodes the COVID-19 shock, the Terra/Luna collapse, the FTX bankruptcy, and the Silicon Valley Bank failure and associated USDC deep and receding during calmer periods, with tail-quantile spillovers substantially exceeding median spillovers. Third, the safe-haven properties once associated with Bitcoin appear to have eroded as the asset has become more tightly integrated with normal financial infrastructure through exchange-traded products, institutional custody arrangements, and shared investor bases.

Several avenues merit further research. Longer post-institutionalization samples are needed to determine whether the weakening of Bitcoin's safe-haven properties represents a perpetual structural shift or a temporary feature of the 2020–2023 period. The growing role of tokenized real-world assets and on-chain representations of traditional securities raises new queries about whether spillover will increasingly occur through direct asset-level linkages rather than the indirect sentiment, liquidity, and stablecoin channels emphasized in the existing literature. Finally, as central bank digital currencies move from pilot to deployment in several major economies, researchers will need frameworks capable of distinguishing spillovers attributable to privately issued cryptocurrencies from those attributable to sovereign digital currency infrastructure, a distinction the current literature has only begun to address.

[35]The Richmond Federal Reserve Bank's 2025 discussion of stablecoins and financial stability similarly emphasizes the potential for stablecoin issuers' Treasury holdings to interact with bank deposit dynamics and short-term funding markets, underscoring the case for treating stablecoin infrastructure as a channel warranting prudential attention. "Stablecoins and Financial Stability," Federal Reserve Bank of Richmond, Economic Brief (2025).